

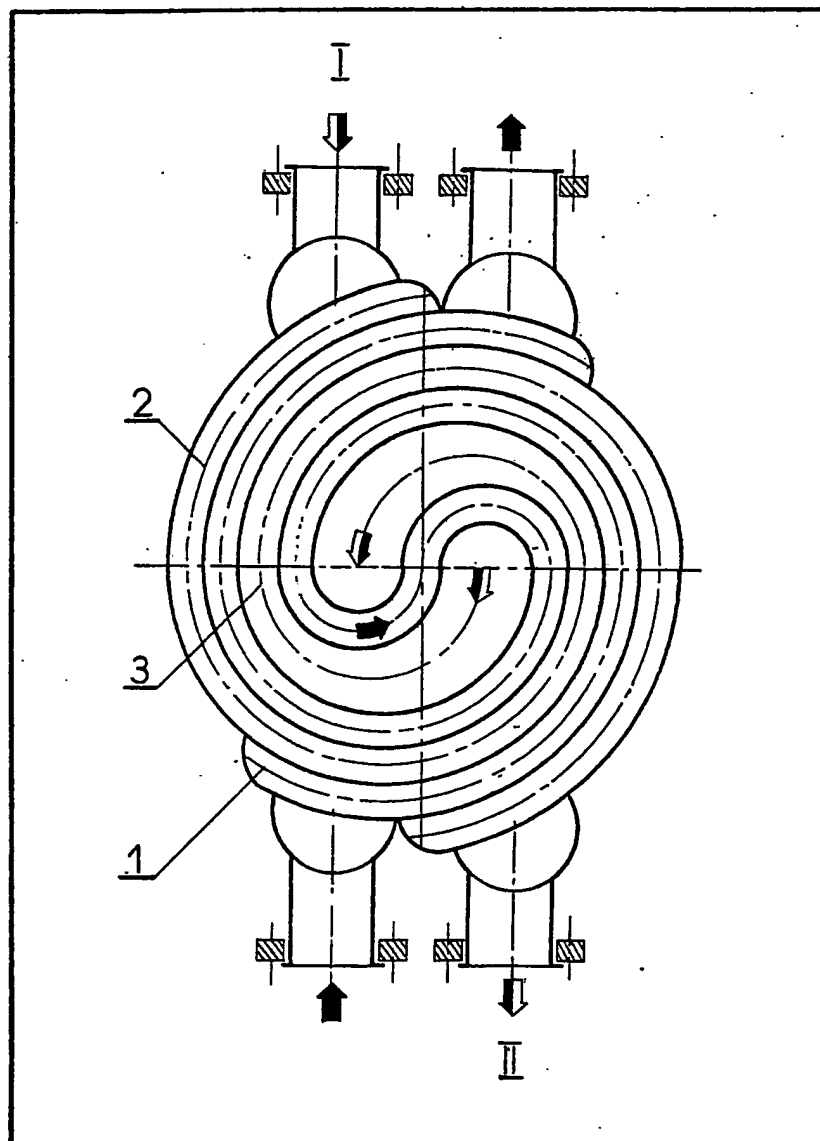
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(71) Applicant
Przedsiębiorstwo Robot
Montazowych Przemysłu
Nieorganicznego
"Montokwas", Katowice,
ul Hutnicza 1, Poland
(72) Inventors
Ryszard Purzynski,
Eugeniusz Matyszek,
Wiktor Majorek
(74) Agent
Baron & Warren

(54) Spiral Heat Exchangers

(57) A heat exchanger comprises a spiral conduit 1 through which flows a

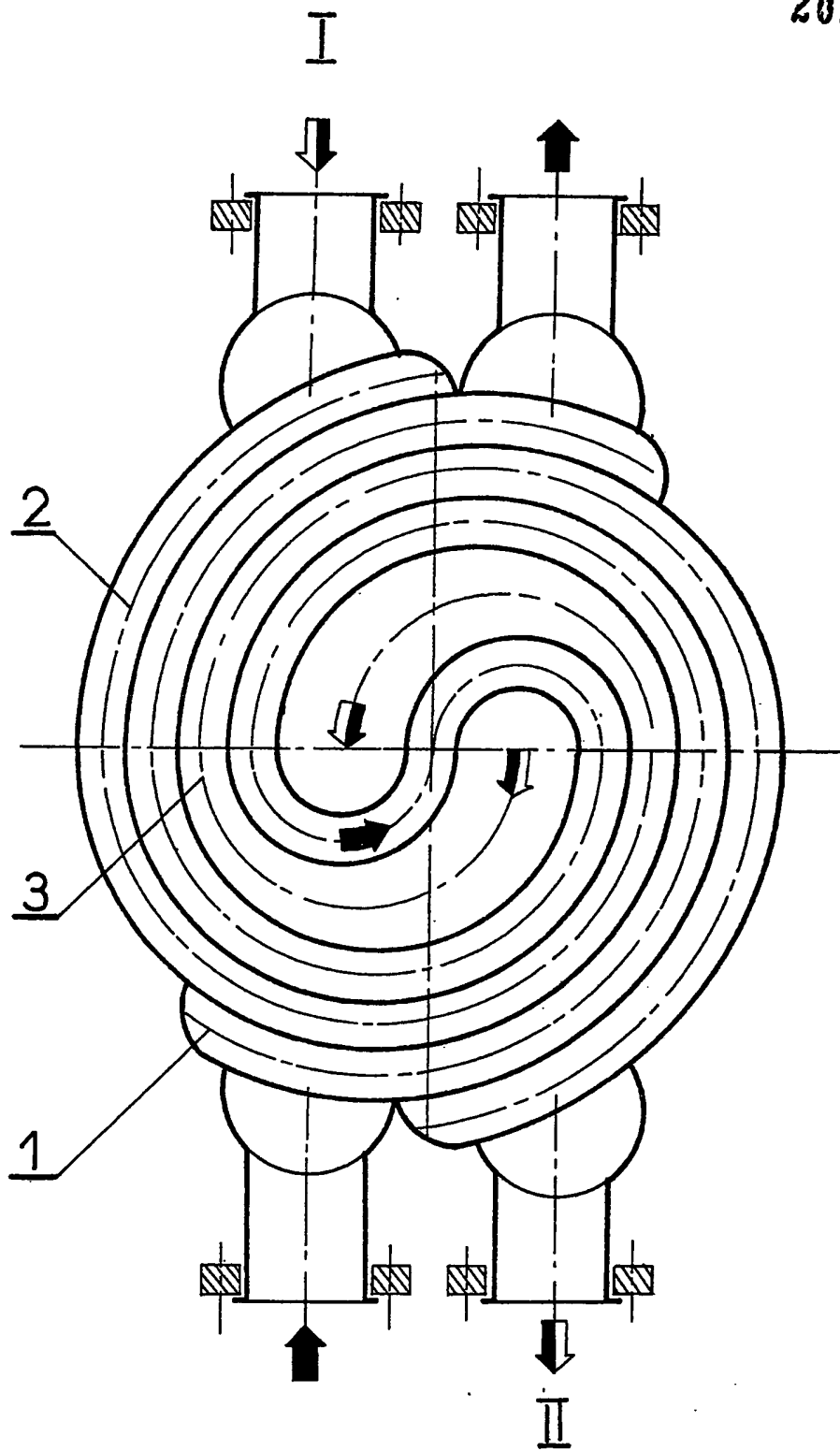
first heat exchange medium and two separate spiral conduits 2 and 3 through which flow two separate streams of a second heat exchange medium.



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Hans Biermaier
Not Yet Assigned

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SPECIFICATION

Improvements in Spiral Heat Exchangers

The present invention relates to spiral heat exchangers, more particularly, for cooling sulphuric acid.

One known spiral heat exchanger described in a publication issued by the Swedish Company, Alfa-Laval, comprises two spiral channels or conduits separated by a wall made from a material having good thermal conductivity. The heat exchanger media flows through these channels on a countercurrent principle. A heat exchanger is also described in U.S. Patent No. 3,477,501 which comprises a tubular element divided into two spaces by a wall. One of the spaces is connected to supply and discharge conduits for a condensable heat-carrier whilst the other space conveys a fluid to be heated. The discharge conduit is connected via a bypass, to at least one other location of the tubular element. In the known heat exchangers the temperature difference distribution between the media along the lengths of the channel or conduits is unsatisfactory. Hence, the heat exchange efficiency is relatively low.

It is an object of the present invention, to improve the efficiency of a spiral heat exchanger. To this end, the invention consists in a spiral heat exchanger, in which the heat exchange media flow through spiral channels or conduits separated by a wall made from a material having good thermal conductivity, and in which two separate channels or conduits are provided for the flow of two separate streams of one of the media.

The spiral heat exchanger according to the invention, because it has two separate channels for the flow of two separate streams of one of the heat exchange media, permits a more advantageous temperature difference to be

maintained between the media than in the known exchangers. In this connection, the heat exchange efficiency undergoes a significant improvement, and this allows the size of the exchanger to be reduced or lessens the number of exchanger sections required in a heat exchanger assembly.

In order that the present invention may be more readily understood, reference will now be made to the accompanying drawing which illustrates a cross-section through one embodiment.

Referring to the drawing, the exchanger comprises a conduit 1, through which flows the heating medium or the medium to be cooled, extending spirally from the outside of the exchanger to the centre thereof, where the direction of the spiral is changed and the conduit 1 then extends spirally to the outside of the exchanger. The conduit 2, through which flows a stream I of a cooling medium, extends spirally from the outside of the exchanger to the inside, from where the cooling medium is discharged from the exchanger. The channel 3, through which flows a stream II of the cooling medium, extends spirally from the inside of the exchanger where the cooling medium is delivered to the exchanger to the outside. The heat exchanger is made from stainless, acid-resistant steel.

Claims

1. A spiral heat exchanger in which the heat exchange media flow through spiral channels or conduits separated by a wall made from a material having good thermal conductivity, and in which two separate channels or conduits are provided for the flow of two separate streams of one of the media.

2. A spiral heat exchanger substantially as hereinbefore described with reference to the accompanying drawing.